Lat 40.35682 Lon -123.12053

United States Department Of Agriculture
Forest Service
Shasta-Trinity National Forests
2400 Washington Avenue
Redding, CA 96001

Reply To: 3420 Date: May 20, 1991

Subject: Evaluation of Pine Mortality Following Thinning in Dubit Kelly B Plantation, Yolla Bolla RD (FPM Rept. N91-8)

To: Forest Supervisor, Shasta-Trinity NFs

Dubit Kelly B plantation is located west of the Wildwood-Mad River Road, near Dubakella Creek. The area was planted with Douglas-fir and ponderosa pine in 1973 following a timber harvest. Some white fir had naturally seeded into the plantation. In late July 1990, the plantation was thinned from about 400 trees per acre down to 185-190 trees per acre. During March 1991, the crowns of about 10 ponderosa pines in one area of the plantation faded. Randy Jost from the District examined the trees and found they had been infested with pine engraver beetles, Ips spp. He had a concern about the possibility of additional mortality in the plantation.

The plantation was examined on April 23, 1991 by Dave Schultz, Gregg DeNitto and Sheri Smith from the Forest Pest Management Northern California Service Area. Randy Jost and Jeff Paulo provided assistance from the District. In addition to the obviously dead trees with orange foliage, several additional trees in the area were dead, but had not faded. There were also several ponderosa pines which were alive, but had numerous spots of cambium killed by unsuccessful pine engraver attacks. None of the Douglas-fir or white fir trees in the plantation were dead. Several white firs had resin running from Scolytus subscaber attacks at branch bases. The attacks on the white firs indicate that the trees were under considerable stress last summer.

The trees were thinned to approximately 15 foot spacing. The slash was bucked into 4 foot lengths and lopped to a slash depth of 30 inches. Each of the ponderosa pines which was dead, or heavily attacked by pine engravers, was located within a few feet of the stem of a pine tree that was cut during thinning. The initial pine engraver attacks occurred on the stems of the cut pines which were over 3 inches in diameter. Success appeared highest in stems which had some shade from the slash, or foliage on adjacent leave trees, or stumps and logs from the previous stand. An aggregating pheromone released when pine engraver beetles infested the slash attracted additional beetles toward the attack site. Standing pine trees located within about 5 feet of slash which was being infested also came under attack by pine engravers. Some trees which survived the initial attack last year have enough injuries from unsuccessful attacks to be more susceptible to attack this year.

Adult pine engraver beetles should emerge from the slash and standing trees in the plantation during May. Adequate soil moisture should make most plantation trees able to resist attack. Pine engraver populations should decline if the

only available hosts are standing trees. A relatively small number of trees which were unsuccessfully attacked last year may be killed this year. Mortality within the plantation should be low, and will pose no threat to the surrounding areas. At this point, it would take a very large effort to prevent the possible loss of a few additional trees. Any limited effort to clean up the area by removal of the current mortality will result in only a slight change in the appearance of the area.

There are some measures which could be used in future thinning operations to reduce the probability of mortality of leave trees. These measures are generally listed in order of effectiveness, or operational feasibility.

1. Thin at an earlier age. Slash from pines under 3 inches diameter rarely produces enough pine engraver brood to cause any tree mortality. The smaller size and volume of slash generated during early thinning may also be beneficial from the viewpoint of fuel management, or other resources. In pine plantations where the competetion consisted mostly of manzanita and whitethorn, early thinning has not caused the plantation to lose site dominance.

2. Avoid disturbing pine already under stress. Most silvicultural activities, such as thinning, cause short-term stress on the leave trees. If these stresses are added to trees with existing stresses from causes such as drought or recent fire-scorch, it may cause the trees to be very susceptible to attack by beetles. Mortality can be avoided by deferring activities in pine stands under stress, or by shifting such activities to areas where the risk of mortality is acceptable.

3. Continue to thin during late summer and fall. The risk of causing mortality by pine engravers infesting pine slash is lowest during the period from July through December. Pine engraver adults tend to avoid infesting host material which is exposed to direct sunlight. Even if some slash becomes infested during this period, as in the case of the Dubit Kelly B plantation, the total amount of mortality is generally low.

4. Remove host material by biomass harvesting. Pine stems which are either chipped, or are removed from the site immediately after being cut have no potential to cause pine engravers to attack leave trees. Steep slopes, design standards of forest roads, and long haul distances have limited the application of biomass harvesting in some areas.

5. Move cut pine bolts away from pine leave trees. The chance of accidental attack would be lower if bolts of cut pine over 3 inches in diameter were moved at least 5 feet from pine leave trees. The number of bolts to be moved in a mixed species plantation appears to be reasonably low. The additional amount of labor, or contract cost, would have to be weighed against the value of preventing a small amount of mortality.

6. Lop slash more completely. Additional lopping of slash should result in more stem exposed to sunlight, and theoretically, less slash infested by pine engravers. Lopping slash to meet fuel modification standards will generally have only a low to moderate level of effectiveness in preventing infestation by

pine engravers. The additional amount of lopping necessary to be effective in preventing infestation would increase the amount of cutting by several times. The additional expense needed to prevent a small amount of mortality might be justified in areas where recreation or visual quality have a high value.

The slash treatment measures listed were only briefly discussed in general terms. Specific conditions or activities which are proposed for individual sales may change the relative ranking of the slash treatment measures. The Forest Pest Management staff is available to discuss these treatments, or other pest management methodologies, prior to their implementation.

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